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MEMORANDUM FOR PRS (In-House Publication)

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SUBJECT: Authorization for Release of Technical Information, Control Number: **AFRL-PR-ED-AB-2001-111**
Haddad, Timothy S.; Phillips, Shawn H.; Mather, Patrick T., "Polystyrenes Modified with
Silsesquioxanes"

American Chemical Society
(Chicago, IL, August 26-30, 2001) (Deadline: 31 May 01)

(Statement A)

POLYSTYRENES MODIFIED WITH SILSESQUIOXANES

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We are continuing a program to design and synthesize well-defined, linear polyhedral oligomeric silsesquioxane (POSS) polymers to further develop the structure/property relationships of this important class of technologically useful compounds. A typical POSS-monomer, $R_7P(Si_8O_{12})$, is a well-defined octomer containing a single "P" functionality for polymerization and seven "R" groups to solubilize and compatibilize the inorganic filler with the organic matrix. Previously, we have reported the synthesis and characterization of a variety of POSS-styrene copolymers wherein the POSS unit dangles from the main chain in a pendant fashion. We have noted that the POSS cages appear to generate a reversible network material, and the strength of this network is strongly influenced by the seven "R" groups. This work summarizes and compares the effects of four different R groups: cyclopentyl, cyclohexyl, isobutyl and phenyl.

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